QUALLION

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Re:	Application Serial No.: 10/031,022 Title: Lithium Thin Film Lamination Technology on Electrode to Increase Battery Capacity International Filing Date 14 July 2000 Examiner: John Maples Group Art Unit: 1734 Attorney Docket No.: Q106-US1	**Date:**	October 30, 2003

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Reply to Written Opinion, Rewritten in U.S. Amendment Form

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TRANSMITTAL FORM

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Application Number	10/031,022
Filing Date (International)	14 July 2000
First Named Inventor	Tsukamoto
Art Unit	1734
Examiner Name	John Maples
Attorney Docket Number	Q106-US1

Total Number of Pages in This Submission: 7

ENCLOSURES (Check all that apply)

- ☐ Fee Transmittal Form
- ☐ Fee Attached
- ☒ Amendment/Reply
- ☐ After Final
- ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/ Incomplete Application
- ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
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- ☐ After Allowance communication to Group
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Remarks

Reply to Written Opinion, Rewritten in U.S. Amendment Form

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	M. Elizabeth Bush Quallion LLC
Signature	
Date	10-30-03

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:
TSUKAMOTO, HISASHI et al.

US Serial No.: 10/031,022
from PCT/US00/19348

US National Stage: 14 January 2002
International Filing Date: 14 July 2000

Title: Lithium Thin Film Lamination Technology on Electrode to Increase Battery Capacity

:Examiner: John Maples
:Art Unit: 1734

Honorable Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO WRITTEN OPINION, REWRITTEN IN U.S. AMENDMENT FORM

Introductory Comments

The following is in response to Examiner's telephone call to Applicant on October 29, 2003 to provide the Reply to Written Opinion of 18 Jul 01 in U.S. amendment form and fax it to 703-872-9306.

In response to the Written Opinion dated 13 June 2001, please amend the application as follows.

Amendments to the specification begin on page 2.

A listing of the claims begins on page 3.

Remarks begin on page 6.

Specification:

Page 2, beginning line 14:

In accordance with a preferred embodiment, lithium metal is first deposited onto a carrier, which is then used to transfer the lithium metal to the electrode structure by the application of heat, vacuum, and/or pressure. The carrier preferably comprises a long strip of plastic substrate that is preferable for a continuous transfer of lithium onto or into the electrode. In addition, this approach lends itself to commercial production. The substrate could be one of several materials such as ortho-polypropylene (OPP), Polyethylene Terephthalate (PET), polyimide, or other type of plastic. Lithium metal can be deposited onto or into one or both surfaces of the substrate. The lithium-coated plastic and the electrode material are then placed between two rollers or two plates. Lithium is transferred onto or into the electrode active material by applying heat and/or pressure in vacuum. In a preferred embodiment, the ~~The~~ rollers or plates are heated in vacuum to about 120°C, or within the range of 25°C to 350°C, and a. ~~A~~ pressure of 50 kg/cm^2 to 600 kg/cm^2 is applied to the rollers or plates. ~~Similarly, in the case of two plates, a pressure of 50 kg/cm^2 to 600 kg/cm^2 is applied to the sheets of material between them.~~

Page 3, beginning line 17:

The method could be used with electrodes having ~~for~~ either single-sided coating or double-sided coating. In the double-sided coating method, both sides of the metal substrate are coated with active material. The coated metal substrate is then sandwiched between two lithium-coated plastic carriers, with the lithium sides facing the active material on the coated metal substrate. All three sheets are then fed into a mechanism for applying heat and/or pressure in vacuum. As a result, lithium is transferred to both sides of ~~the electrode structure, i.e.,~~ the coated metal substrate.

Listing of the Claims:

1. (currently amended) A method to laminate lithium onto an electrode comprising the steps of:

(a) utilizing an electrode structure including a substrate coated with active material ~~consisting of, as a negative electrode example, a mixture of graphite and a binder~~;

(b) utilizing a lithium coated plastic sheet ~~where in said plastic sheet is selected from the group consisting of oriented polypropylene (OPP) polyethylene Terephthalate, and polyimide~~;

(c) pressing the said electrode material and said lithium coated sheet ~~material~~ together using a pair of pressing structures;

(d) moving said electrode structure and lithium coated sheet through the pressing structures; and

(e) applying pressure and heat in vacuum to said electrode structure and said lithium coated sheet while moving them through said pressing structures. ~~materials while they are pressed together by said pressing structures;~~

~~(e) moving said materials though the pressing structures while applying continuous pressure and heat to said materials as they move through said pressing structures.~~

2. (original) The method of claim 1 further comprising the step of utilizing the said laminated electrode in lithium or lithium ion batteries.

3. (original) The method of claim 1 further comprising the step of utilizing a pair of rollers as the pressing structures.

4. (original) The method of claim 1 further comprising the step of utilizing a pair of plates as the pressing structures.

5. (currently amended) The method of claim 1 further comprising the step of applying heat ~~in a vacuum atmosphere by utilizing said pressing structures~~ at a temperature within the range 25°C to 250°C.

6. (original) The method of claim 1 further comprising the step of applying pressure in the range of 50 kg/cm^2 to 600 kg/cm^2 utilizing said pressure structures.

7. (currently amended) A method for increasing the storage capacity of a lithium ion battery including the steps of:

(a) providing an electrode structure comprised of a metal substrate coated with active material; and

(b) depositing lithium onto or into said active material to reduce cavities therein; wherein said depositing step includes:

(b1) providing a sheet carrier bearing a layer of lithium metal; and

(b2) pressing said layer of lithium metal against said active material to transfer lithium onto or into said active material.

8. (currently amended) The method of claim 7 wherein said depositing step further includes:

(a) applying heat and/or pressure in vacuum to said carrier and/or said electrode structure to facilitate transfer of said lithium. ~~providing a sheet carrier bearing a layer of lithium metal; and~~

~~(b) pressing said layer of lithium metal against said active material to transfer lithium onto or into said active material.~~

9. (cancelled)

Remarks

The specification has been revised to enhance text clarity and correct format inconsistencies.

Claim 1 has been amended to avoid the objection under PCT Rule 66., to generally enhance clarity by providing more consistent antecedent basis, and to better define claim scope.

Claim 5 has been amended to eliminate redundancy.

Claim 7 has been amended to incorporate the limitations of original claim 8.

Claim 8 has been amended to incorporate the limitations of prior claim 9.

Conclusion

Claims 1-8 should all now satisfy the requirements of novelty, inventive step and industrial applicability, consistent with the Written Opinion.

Favorable reconsideration is courteously requested.

Respectfully submitted,

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